

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/718,086 Confirmation No. 9418  
Applicant : Reade Clemens  
Filed : November 19, 2003  
TC/A.U. : 3724  
Examiner : Phong H. Nguyen  
  
Docket No. : EH-10546A (01-465A)  
Customer No. : 34704

## DECLARATION

I, DILIP SHAH, hereby declare that:

1. I am currently employed by United Technologies Corporation as a FELLOW in High Temperature Materials.
2. I have been employed by United Technology Corporation for 30 years as a Materials Engineer and have been primarily involved in implementation of single crystal nickel base alloys.
3. I have a Ph.D. in Metallurgical Engineering;
4. I have worked in crystallographic technologies for 33 years.
5. I understand that claim 1 in the above-captioned patent application reads as follows:  
  
"1. An indenting tool comprising: a shank having a tip end; a diamond affixed to said tip end by a braze material, said diamond forming a point of the tool; and said diamond being mounted to said tip end within 8 degrees of a <17,12,24> direction."

6. I understand that claim 13 in the above-captioned patent application reads as follows:

"13. An indenting tool comprising a shank having an end; a diamond secured to said end in a wear resistant orientation; and said wear resistant orientation being within 8 degrees of a <17,12,24> direction.";

7. I understand that claim 14 in the above-captioned patent application reads as follows:

"14. A method of making an indenting tool, comprising the steps of: providing a shank having an end; providing a diamond; positioning said diamond in a wear resistant orientation; securing said diamond to said end; and said positioning step comprising positioning said diamond in a wear resistant orientation of within 8 degrees of a <17,12,24> direction."

8. I have read the above-captioned patent application and the drawings;

9. I understand that the Board of Appeals of the U.S. Patent and Trademark Office has said that it is not apparent from the written description and Figure 3 in the above-captioned patent application whether the <17,12,24> direction is that argued by Appellant when Appellant says that one of ordinary skill in the art would know that <17,12,14> refers to 17 units of length in the x direction, 12 units of length in the y direction, and 24 units in the z direction.

10. I understand that the claims have been rejected under 35 U.S.C. 112, second paragraph to be indefinite.

11. In crystallography, it is standard nomenclature to define a direction by its three lengths along the x, y, and z axes. One of ordinary skill in the art would know that one determines the direction by starting at a  $\langle 0,0,0 \rangle$  point. Also one of ordinary skill in the art would know that in this context the symbol "<" and ">" are used as parentheses and do not have the usual mathematical implication of "greater than" or "less than", respectively. One of ordinary skill in the art would know that the first number within the brackets is the length along the x-axis, the second number within the brackets is the length along the y-axis, and the third number within the brackets is the length along the z-axis. Thus, one of ordinary skill in the art using standard crystallography nomenclature would know that  $\langle 17,12,24 \rangle$  defines a direction from the  $\langle 0,0,0 \rangle$  point which is 17 units in the x-direction, 12 units in the y-direction, and 24 units in the z-direction. Also one of ordinary skill in the art would know that in this context the symbol "< >" are preferentially used as parentheses over other alternate parentheses symbols such as "{ }", "[ ]" and "( )", to imply the following two specific aspects: (a) that one is talking about a direction or a vector and not a crystallographic plane, and (b) that all permutations of the three components of the vectors is implied including their positive and negative values. That is:  $\langle 17,12,24 \rangle$  is used as an abbreviation for all 24 variants such as  $\langle 12,17,24 \rangle$ , or  $\langle -12,17,24 \rangle$ , or  $\langle 12,-17,24 \rangle$ , or  $\langle 12,17,-24 \rangle$ , or  $\langle 17,12,24 \rangle$ , or  $\langle -17,12,24 \rangle$ ,  $\langle 17,-12,24 \rangle$ , and so on. This

implication is essential because all such directions are physically identical owing to cubic crystal symmetry, as labeling of the axes as x, y and z is arbitrary.

12. I do not find any limitation in claims 1, 13 and/or 24 which refers to the diamond being aligned along the axis 24.

13. With respect to claims 1, 13, and 14 as presented in the application, there is nothing indefinite about the claimed subject matter. One of ordinary skill in the art reading the claims in light of the description in the specification and in light of Figure 3 would understand that  $\langle 17, 12, 24 \rangle$  defines a direction from the  $\langle 0, 0, 0 \rangle$  point which is 17 units in the x-direction, 12 units in the y-direction, and 24 units in the z-direction, or any permutation of these. Nothing more is required.

14. Still further, one of ordinary skill in the art having the disclosure in the above-captioned patent application before him/her could make and use the invention which is claimed without undue experimentation. Typically the crystal orientation is determined using X-ray back reflection Laue technique. This or any other diffraction technique creates a pattern of dots (diffraction spots) reflecting the crystal symmetry. One of ordinary skill in the art can analyze this pattern (or use an appropriate software) and based on the angle measurements determine the crystal orientation.

The undersigned declares further that all statements made herein of their own knowledge are true and that all

statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing therefrom.

Dilip M. Shah

DILIP SHAH

Date: Sept. 8, 2008